Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A composite material, comprising:

a fiber media, wherein said fiber media comprises at least one fiber having at least two adjacent T-shaped lobes;

at least one intra-fiber void within said adjacent T-shaped lobes, where each lobe includes a leg and a cap defining said at least one intra-fiber void having a diameter larger than the distance between ends of the adjacent caps;

at least one inter-fiber void; and

at least one microcell in contact with said fiber media, wherein said microcell is an expandable microcell having an unexpanded form and an expanded form, said microcell is capable of engaging both the at least one intra-fiber void and the at least one inter-fiber void due to expansion of the at least one microcell, where the at least one microcell expands to a diameter larger than the distance between the adjacent caps, wherein:

said expanded form of said microcell is entrapped internally within an individual one of said at least one fiber,

said expanded form of said microcell is held between an adjacent pair of said T-shaped lobes within said intra-fiber void, and

~~the diameter of said intra-fiber void is less than the width of said fiber~~at least one air pocket is capable of forming within said composite material when said expanded form of said microcell is entrapped internally within an individual one of said at least one fiber.

2. (Original) A composite material as claimed in claim 1, wherein said fiber media is formed from a polymer.

3. (Original) A composite material as claimed in claim 2, wherein said polymer is selected from the group consisting of a nylon, a polyester, a polyolefin and a combination thereof.

4. (Original) A composite material as claimed in claim 2, wherein said polymer is selected from the group consisting of polyester, polypropylene, and nylon 6 with FAV (Formic Acid Viscosity) of at least about 65.

5. (Original) A composite material as claimed in claim 1, wherein said fiber media is formed from a mineral.

6. (Original) A composite material as claimed in claim 5, wherein said mineral is glass.

7. (Previously Presented) A composite material as claimed in claim 1, wherein said microcell is a microsphere.

8. (Previously Presented) A composite material as claimed in claim 1, wherein said unexpanded form is capable of passing into and out of said intra-fiber void and wherein said expanded form is inhibited from passing into and out of said intra-fiber void.

9. (Previously Presented) A composite material as claimed in claim 1, wherein said T-shaped lobes are continuously longitudinal lobes.

10. (Previously Presented) A composite material as claimed in claim 1, wherein said fiber has at least three T-shaped lobes, and said T-shaped lobes are continuously longitudinal lobes.

11. (Currently Amended) A composite material, comprising:

a fiber media, wherein said fiber media is formed from a polymer and said fiber media comprises at least one fiber having a shape factor of at least about 1.5 and having at least two adjacent T-shaped lobes;

at least one intra-fiber void within said adjacent T-shaped lobes, where each lobe includes a leg and a cap defining said at least one intra-fiber void having a diameter larger than the distance between ends of the adjacent caps, and said intra-fiber void is disposed internal to said fiber;

at least one inter-fiber void; ~~and~~

at least one expanded microcell in contact with said fiber, wherein said expanded microcell is capable of engaging both the at least one intra-fiber void and the at least one inter-fiber void due to expansion of the at least one microcell, where the at least one microcell expands to a diameter larger than the distance between the adjacent caps, said expanded microcell is entrapped internally within an individual one of said at least one fiber; and

at least one air pocket within said composite material when said at least one expanded microcell is entrapped in said at least one intra-fiber void.

12. (Original) A composite material as claimed in claim 11, wherein said shape factor is between about 1.5 and about 6.

13. (Original) A composite material as claimed in claim 11, wherein said shape factor is between about 2 and about 4.

14. (Original) A composite material as claimed in claim 11, wherein said polymer is selected from the group consisting of a nylon, a polyester, a polyolefin and a combination thereof.

15. (Original) A composite material as claimed in claim 11, wherein said polymer is selected from the group consisting of polyester, polypropylene, and nylon 6 with FAV (Formic Acid Viscosity) of at least about 65.

16. (Previously Presented) A composite material as claimed in claim 11, wherein said T-shaped lobes are continuously longitudinal lobes.

17. (Currently Amended) A composite material, comprising:

a fiber media comprising at least one fiber, wherein said fiber media is formed from a polymer selected from the group consisting of polyester, polypropylene, and nylon 6 with FAV (Formic Acid Viscosity) of at least about 65, said fiber media comprises at least one fiber having a shape factor of between about 1.5 and about 6 and having at least two continuously longitudinal T-shaped lobes;

at least one intra-fiber void within adjacent T-shaped lobes, where each lobe includes a leg and a cap defining said at least one intra-fiber void having a diameter larger than the distance between ends of the adjacent caps;

at least one inter-fiber void; ~~and~~

at least one expanded microsphere in contact with said fiber media, wherein said expanded microsphere is capable of engaging both the at least one intra-fiber void and the at least one inter-fiber void due to expansion of the at least one expanded microsphere, where the at least one expanded microsphere expands to a diameter larger than the distance between the adjacent caps, and said expanded microsphere is held internal to said fiber by

said adjacent T-shaped lobes, and said expanded microsphere has a diameter less than the width of said fiber; and

at least one air pocket within said composite material when said at least one expanded microsphere is entrapped internally within said at least one intra-fiber void.

18. (Currently Amended) A method for producing a composite material, comprising the steps of:

providing a fiber media, said fiber media comprises at least one fiber having at least two T-shaped lobes;

forming at least one intra-fiber void and at least one inter-fiber void;

defining said at least one intra-fiber void within adjacent T-shaped lobes each having a leg and a cap, where said at least one intra-fiber void has a diameter larger than the distance between ends of the adjacent caps; and

incorporating at least one microcell into said fiber media, wherein said microcell is engaged by at least one of said intra-fiber void and said inter-fiber void due to expansion of the at least one microcell, where the at least one microcell expands to a diameter larger than the distance between the adjacent caps; ~~and~~

entrapping the at least one microcell within the at least one intra-fiber void such that the microcell is retained internally within an individual one of said at least one fiber; and

forming at least one air pocket within said composite material by incorporating said at least one microcell within said at least one intra-fiber void.

19. (Original) A method for producing a composite material as claimed in claim 18, wherein said microcell is an expandable microcell, and further comprising the step of applying a triggering energy capable of expanding said expandable microcell.

20. (Original) A method for producing a composite material as claimed in claim 18, wherein said fiber media is formed from a polymer.

21. (Original) A method for producing a composite material as claimed in claim 20, wherein said polymer is selected from the group consisting of a nylon, a polyester, a polyolefin and a combination thereof.

22. (Original) A method for producing a composite material as claimed in claim 20, wherein said polymer is selected from the group consisting of polyester, polypropylene, and nylon 6 with FAV (Formic Acid Viscosity) of at least about 65.

23. (Original) A method for producing a composite material as claimed in claim 18, wherein said fiber media is formed from a mineral.

24. (Original) A method for producing a composite material as claimed in claim 23, wherein said mineral is glass.

25. (Cancelled)

26. (Previously Presented) A composite material as claimed in claim 1, wherein:

said expanded form is capable of expanding to a volume about 40 times the volume of the unexpanded form.

27. (Previously Presented) A composite material as claimed in claim 1, wherein said microcells are capable of an expanded diameter of about 80 microns.

28. (Previously Presented) A method for producing a composite material as claimed in claim 18, wherein said fiber media comprises at least one fiber having a shape factor of between about 2 and about 4.

29. (Currently Amended) A composite material, comprising:

at least one lobed fiber having a plurality of longitudinal lobes, said lobes jointly defining at least one intra-fiber void, said intra-fiber void disposed internal to said fiber; ~~and~~

at least one expandable microcell in contact with said lobed fiber, said microcell disposed internal to said lobed fiber, said microcell adapted for expansion from an unexpanded form to an expanded form within said intra-fiber void; and

at least one air pocket within said composite material formed by incorporating said at least one microcell within said at least one intra-fiber void, wherein:

said expanded form of said microcell occupies said intra-fiber void, and

said expanded form of said microcell is held within said intra-fiber void due to said expansion of said microcell.

30. (Previously Presented) A composite material according to claim 29, wherein said microcell is held within said intra-fiber void by an adjacent pair of said longitudinal lobes.

31. (Previously Presented) A composite material according to claim 29, wherein said expanded form of said microcell comprises:

a shell, and

a microcell core enclosed by said shell, wherein said microcell core comprises a blowing agent condensate.

32. (Previously Presented) A composite material according to claim 31, wherein said microcell core further comprises a vacuum.

33. (Previously Presented) A composite material according to claim 31, wherein said microcell core further comprises a gas selected from the group consisting of carbon dioxide and nitrogen.

34. (Previously Presented) A composite material according to claim 29, wherein said expanded form is capable of expanding to a volume about 40 times the volume of said unexpanded form.

35. (Previously Presented) An insulating composition, comprising:

a composite material including at least one microcell having an expanded form, and at least one lobed fiber, wherein said expanded form of said microcell is held internally within an intra-fiber void of said lobed fiber.

36. (Previously Presented) An insulating composition according to claim 35, wherein said lobed fiber comprises a central core and a plurality of longitudinal lobes projecting from said central core, and said intra-fiber void is disposed between an adjacent pair of said longitudinal lobes.

37. (Previously Presented) An insulating composition according to claim 35, wherein:

said lobed fiber has at least two longitudinal lobes, each of said lobes comprising a leg and a cap,

said intra-fiber void is defined by said leg and said cap of an adjacent pair of said lobes,

an adjacent pair of said caps define a distance between ends of said caps,

said microcell has an unexpanded form, wherein the diameter of said unexpanded form is less than the distance between said ends of said caps, and

the diameter of said expanded form is greater than the distance between said ends of said caps.

38. (Previously Presented) An insulating composition according to claim 35, wherein said lobed fiber comprises a mineral fiber.

39. (Previously Presented) An insulating composition according to claim 35, wherein said expanded form of said microcell comprises:

a shell, and

a microcell core enclosed by said shell, wherein said microcell core comprises a vacuum and a blowing agent condensate.

40. (Previously Presented) An insulating composition according to claim 39, wherein said shell comprises a polymer or a glass.

41. (Previously Presented) An insulating composition according to claim 39, wherein said shell has a tube shape.

42. (Currently Amended) A method for making a composite material, comprising:

a) providing at least one lobed fiber having a plurality of longitudinal lobes, said lobes jointly defining at least one intra-fiber void, said intra-fiber void disposed internal to said lobed fiber; ~~and~~

b) incorporating at least one unexpanded form of a microcell into said intra-fiber void; and

c) after said step b), expanding said microcell to provide an expanded form of said microcell, such that said expanded form of said microcell

is held between an adjacent pair of said lobes, said expanded form of said microcell occupies said intra-fiber void, and said expanded form of said microcell is disposed internal to an individual one of said lobed fiber, wherein at least one air pocket is formed within said composite material by incorporating said at least one microcell within said at least one intra-fiber void.

43. (Previously Presented) A method for making a composite material, according to claim 42, wherein said step a) comprises spin-draw fiber manufacturing of said lobed fiber, and said step b) is performed concurrently with said step a).

44. (Previously Presented) A method for making a composite material, according to claim 42, wherein said fiber provided in said step a) is electrostatically charged.

45. (Previously Presented) A method for making a composite material, according to claim 42, wherein said step b) comprises air-jet injecting said microcells on a surface of said fiber.